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2008 NORTH IDAHO DOUGLAS-FIR TUSSOCK MOTH TRAPPING SYSTEM REPORT

Lee Pederson, Entomologist,
Doug Wulff, Biological Science Technician
USDA Forest Service, Northern Region Coeur d'Alene

Jeffrey Fidgen, Lands Program Manager
Tom Eckburg, Lands Program Specialist,
Neal Kittelson, Exotic Forest Pest Data Coordinator
Idaho Department of Lands

INTRODUCTION

Idaho's Douglas-fir tussock moth (DFTM) Early Warning System (EWS) uses a series of pheromone trap sites to identify increasing populations prior to undesirable tree defoliation, a system modified after Daterman et al. (1979). The Idaho Department of Lands (IDL) maintains a network of trap sites (124) from Coeur d'Alene south to Moscow and east to Harvard (Fig. 1). Region 1 of the US Forest Service (USFS-R1) maintains (41) sites from Potlatch to Lucille (Fig. 2). This trapping system is designed to detect population changes over large geographic areas, and to give land mangers advance warning of an impending outbreak.

Five pheromone-baited sticky traps are installed at each site to monitor the flight of male moths. They are placed in a transect with a minimum spacing of 23 meters (75 ft.) between traps. An average trap catch of 25 moths is the threshold used to indicate where heavy defoliation may occur the following year. Follow-up sampling is then conducted in these areas to pinpoint injurious population densities (Daterman et al. 1979) and to apply treatments, if necessary.

METHODS

2008 Trapping Results

A total of 153 sites were monitored between IDL and USFS-R1 in North Idaho during 2008. Mean trap capture for IDL traps was 1.12 moths per trap, up from 0.42 and 0.33 moths per trap in 2007 and 2006 respectively. Mean trap capture for USFS-R1 was 0.30 moths per trap compared to 0.47 and 0.24 in 2007 and 2006 respectively. Neither IDL nor USFS sites had trap captures exceeding 25 moths per trap, although Little Plummer Creek (plot ID 803) on the Coeur d'Alene Indian Reservation had an average trap catch of 17.6 moths per trap (Appendix 1).

Defoliation

There was no aerially detected DFTM-caused defoliation in North Idaho in 2008. The most recent outbreak in North Idaho occurred in 2000, which resulted in three years of defoliation on State and private land between Plummer and Moscow, and on adjacent Clearwater National Forest lands. Prior to the 2000 outbreak, visible defoliation had also been recorded in 1986 (Fig. 4). Both outbreaks were preceded by increasing numbers of trap captures (Randall 2002) (Fig. 3). Outbreaks of DFTM have occurred in this general area approximately every 8-10 years since the 1940's.

Larval Surveys

Idaho Department of Lands typically conducts larval sampling in North Idaho using a lower threshold than 25 moths per trap. Trap sites with an average catch of $\geq$5 moths per trap, or historical trouble spots are likely sites for larval surveys in the surrounding areas. Larval surveys were performed at 38 of the 124 plots trapped by IDL in 2008 (Appendix 1), using the sequential sampling methods described by Mason (1978). All sampled plots had low populations. A single larva was collected at each of the following sites: Mason Butte (plot ID 800), Little John Creek (plot ID 105) and Rocky Point (plot ID 714).

CONCLUSIONS

The DFTM, EWS has been effective at predicting outbreaks in North Idaho. The two latest outbreaks were preceded by several years of increasing trap catches. However, the intensity of the outbreaks was not predicted by trapping alone. Trap catches preceding defoliation in 1986 were similar to trap captures prior to the 2000 outbreak; yet the intensity of the two outbreaks was very different. The outbreak in 1986 caused detectable defoliation for one year, while defoliation in the 2000 outbreak was evident for three years. This confirms the need for additional population sampling, such as egg mass and larval sampling to help determine the intensity of outbreaks (Mason and Torgersen 1983, Kegley et al. 2004).

Cocoon and egg mass surveys are conducted in the fall of the same year that trap catches reach the threshold of 25 moths per trap. Larval surveys are performed in the spring and summer of the following year. All surveys are conducted in the vicinity of established plots or in other areas of concern. Cocoon and larval surveys provide estimates of population densities and give more accurate indications of outbreak potential and population trends. Pheromone trapping is designed to detect population changes over large geographic areas.

The DFTM, EWS *is not designed nor intended* to predict exactly where the defoliation will occur. Areas sampled on the ground are selected on the basis of the impact of potential DFTM defoliation on management objectives. Douglas-fir tussock moth EWS traps *are not* calibrated for use during an actual DFTM outbreak. As populations increase, a decline in trap catches will typically be noted. Once the traps have signaled a population increase, larval and cocoon/egg mass surveys are used to determine population levels in that particular area (Sheehan and Ragenovich 2002).

Increasing trap captures indicate that populations are on the rise. In addition, defoliation of urban and landscape blue spruce often precedes outbreaks in rural forest settings. This year, DFTM defoliation in upper crowns of blue spruce was observed in North Idaho communities of Coeur d'Alene, Rathdrum, and St. Maries.

LITERATURE CITED

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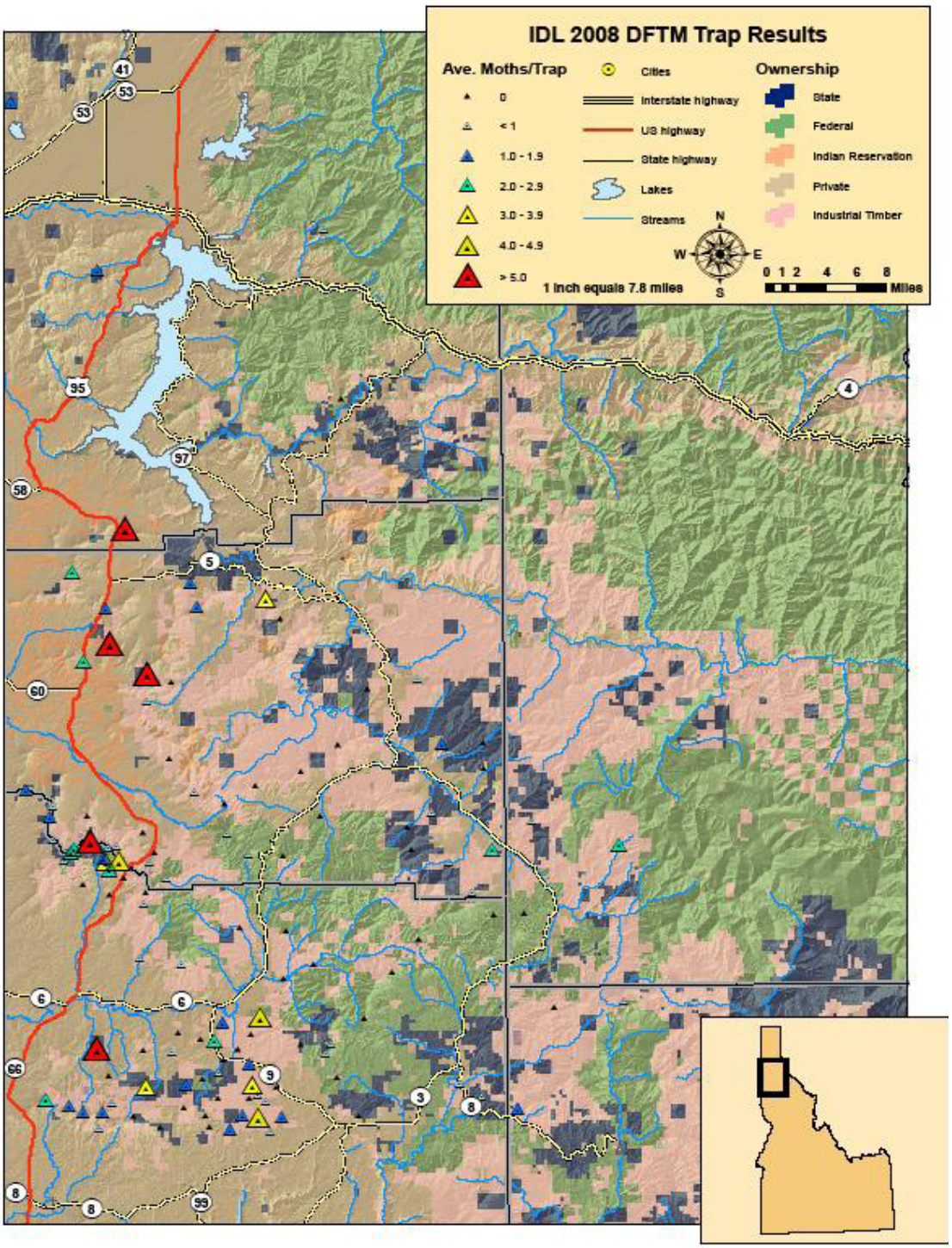

Figure 1. Map of DFTM plots trapped by IDL in 2008.

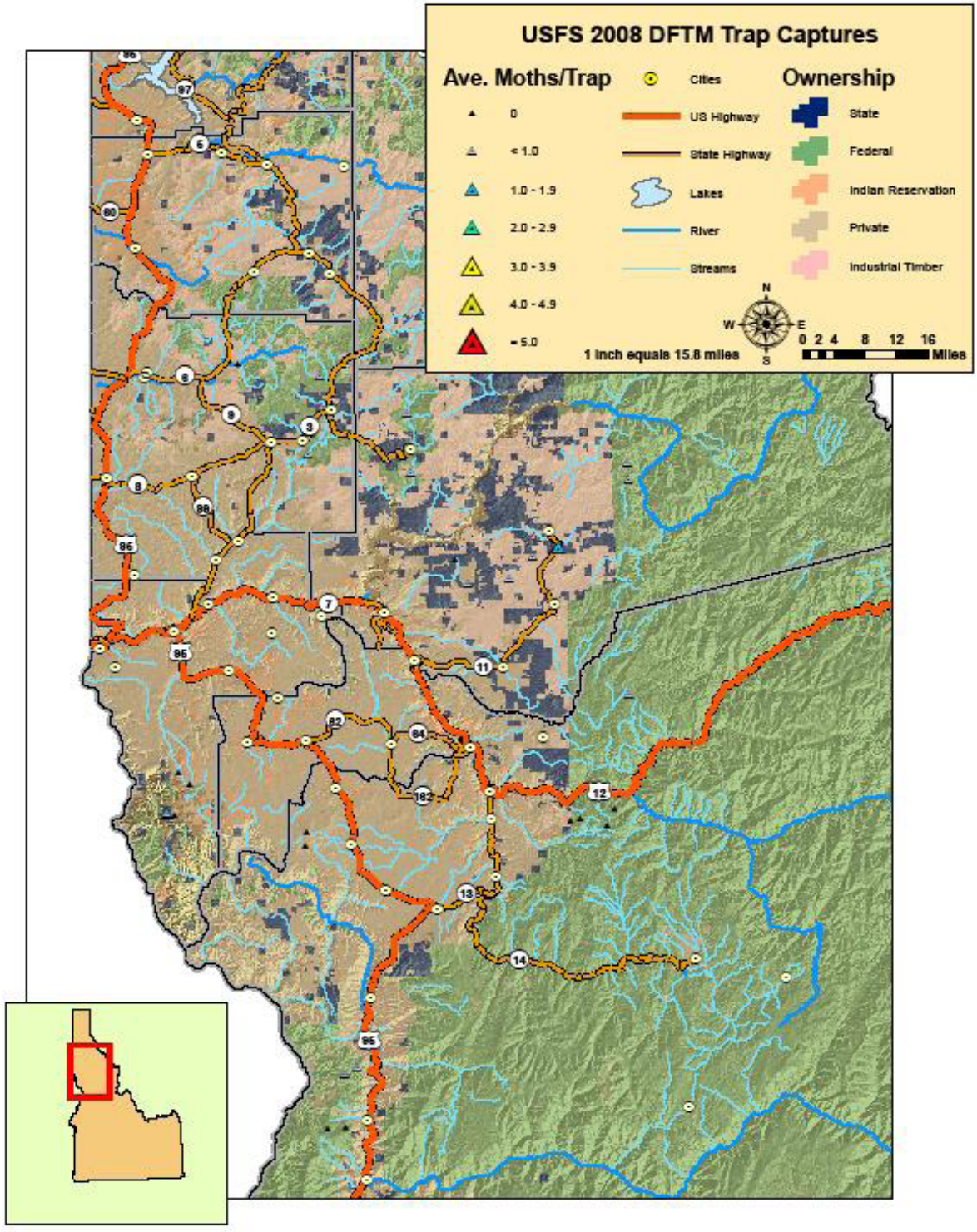

Figure 2. Map of DFTM plots trapped by USFS in 2008.

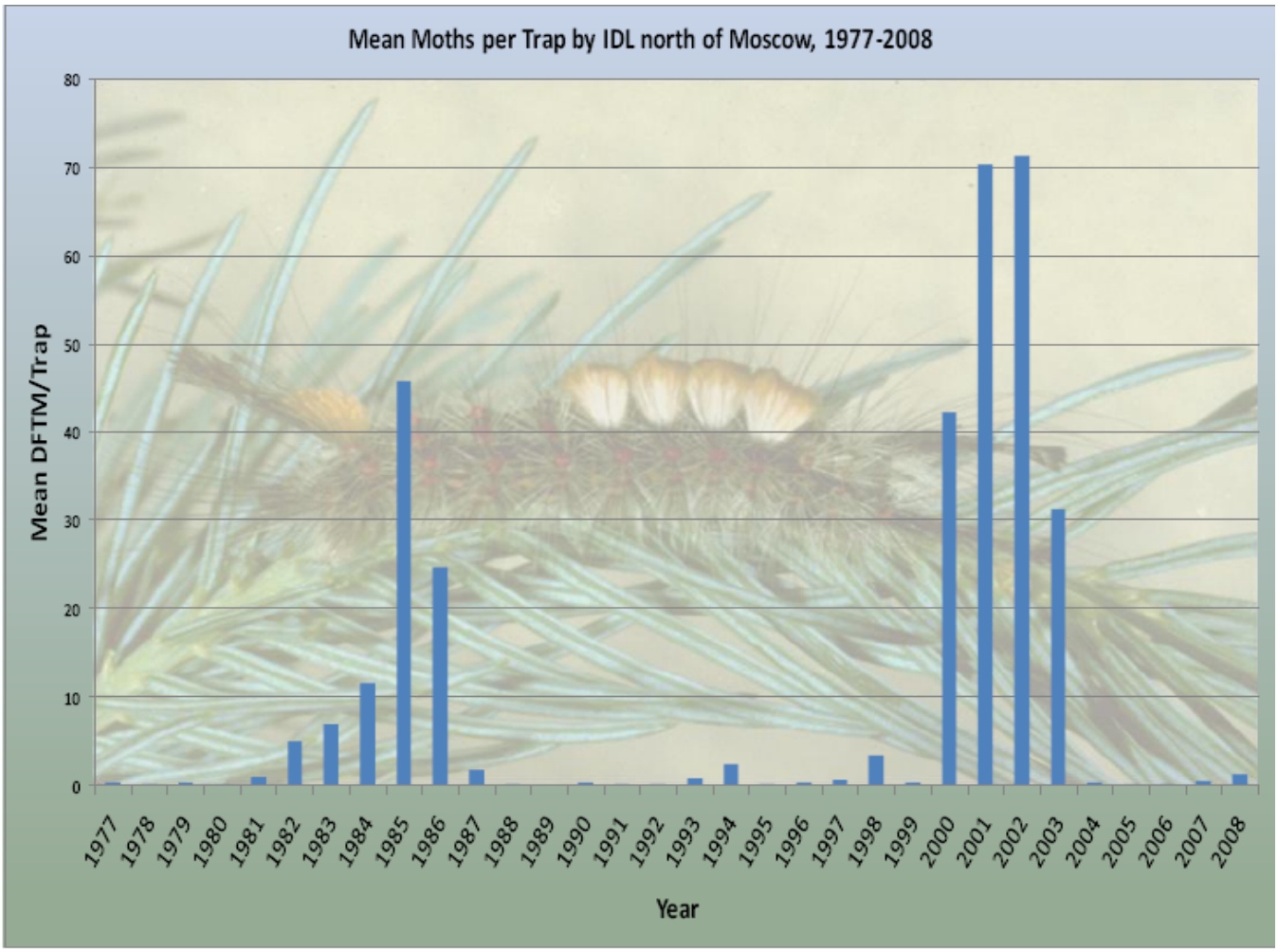

Figure 3. Mean trap catches of DFTM by IDL for plots north of Moscow from 1977 through 2008.

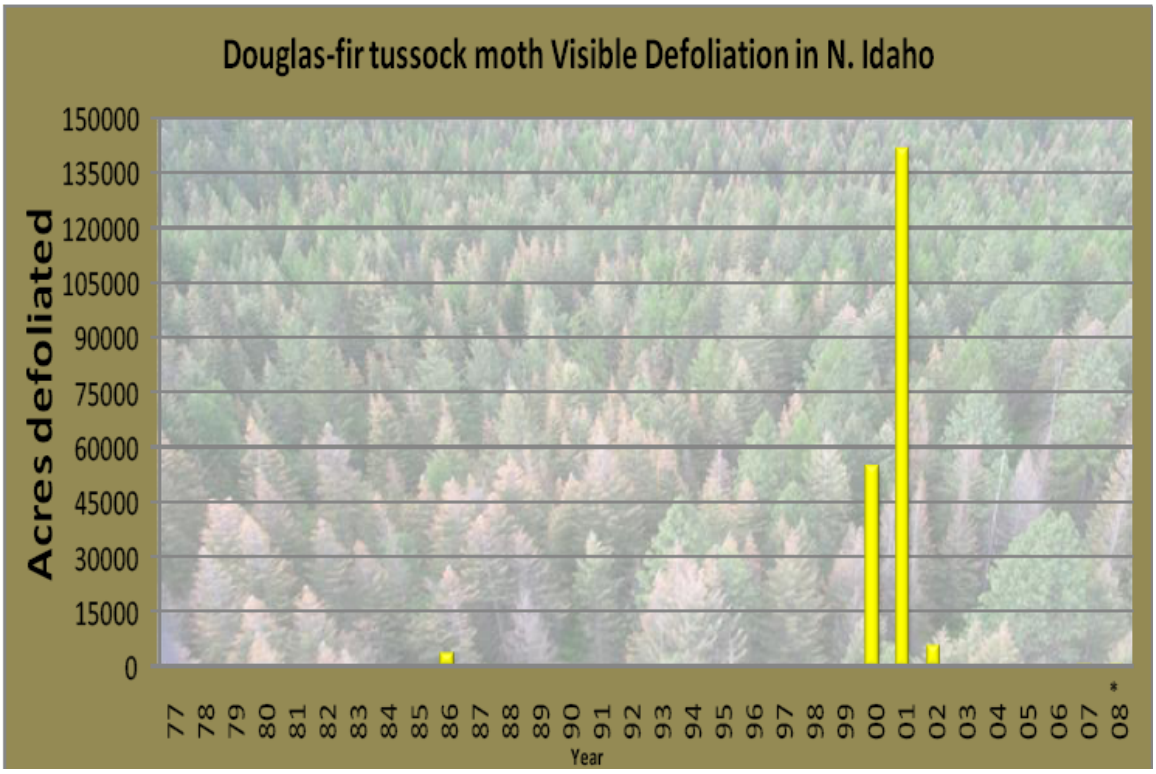

Figure 4. Aerially detected defoliation for the last two DFTM outbreaks.

Appendix 1. (continued)

IDL 2001 - 2008 Douglas-fir Tussock Moth Trap Results Cont.

		Mean Number of Moths Per Trap							
Plot #	Area	2008	2007	2006	2005	2004	2003	2002	2001
216	1 mi NW of Mineral Mtn	0.8	0‡	0.4	0	0.4	0.2	1	0.2
217	Head of Sheep Creek (216-117-2)	7.8	0‡	0.2	0	0.2	0.6	21.2	97.2
300	Mission Mountain (#2)	2.2	0	0.4	0	0.4	0.6	6.4	67.0
301	1.5 mi S of Mineral Mtn	2.4	0‡	0.2	0	0.2	0.2	69.4	91.2
302	Middle Fork of Deep Creek 1 (301-216-1)	3.6‡	1	*	0	0	0	63.8	3.6
303	Middle Fork of Deep Creek 2 (301-216-3)	1.6	0.2	0.4	0	0.2	1	58	15.8
400	3 mi S of Mineral Mtn	0.0‡	0.6‡	0.2	0	0.2	0.6	75.8	86.6
401	Flynn Butte	0.0	0	0	0	0	3.2	95.2	96.4
402	2 mi SE of Browns Mdw	0.0	0.2‡	0.2	0	0.2	0	15.2	57.4
500	3 mi SW of Harvard	0.0	0‡	0.2	0	0.2	0	18.8	74.6
501	3 mi S of Moon Hill	0.0	0	*	0	0	0	16.2	97.6
502	3 mi W of Crane Point	0.0	0.2	*	0	0	0.6	67.6	75.0
503	3 mi N of Stanford Point	1.0‡	1	*	0	0	0	10.2	89.4
504	2 mi N of Stanford Point	0.0	0‡	0.4	0	0.4	0.2	47.8	86.2
505	1 mi SW of Stanford Point	1.6	0.2‡	*	0	0	0	38.4	47.0
506	1 mi S of Stanford Point	4.0‡	1	*	0	0	0	23.4	67.8
507	1 mi NE of Stanford Point	0.8	0	0	0	0	0.8	40.6	87.4
508	1 mi W of Stanford Point	0.0‡	0.4	0.2	0	0.2	0	20.6	92.4
509	2 mi NW of Stanford Point	0.8‡	1.2‡	0.6	0.2	0.4	0.4	43.2	81.6
510	Moon Hill	1.2	0‡	0.2	0	0.2	0.8	35	67.2
511	2 mi SE of Moon Hill	2.4	0	*	0	0	0.2	13.2	80.4
512	3 mi S of Mineral Mtn	0.0	0	*	0	0	0.2	70.2	*
513	2 mi SW of Moon Hill	0.0‡	1.4	*	0	0	0	9.6	9.2
514	1.5 mi NW of Avon	0.0	0	*	0	0	0	6.8	61.4
600	3.4 mi NNW of Princeton	0.2	0.25‡	*	*	*	*	*	*
601	Macumber Meadows	0.0	0‡	*	*	*	*	*	*
602	S of Shay Hill	1.2	0.2	*	*	*	*	*	*
603	3 mi. S of Chatcolet	3.6	0	*	*	*	*	*	*
701	Fourmile Creek	2.2‡	0.4	*	0	0	0	9	88.6
702	North of Granite Point	0.6	0	*	0	0.2	0	5.8	76
703	Bergs Creek	0.0	0	*	0	0	0	12.2	96.6
704	West Fork Big Bear Creek	0.8	0‡	0.2	0	0.2	0.2	13.2	61
705	2 Mi NW of Stanford PT	3.0‡	1.5‡	0.8	0	0.8	0.4	46.4	89.4
706	1 Mi S. of Iron Mtn	0.2‡	0.8‡	*	0	0	0	27.2	87.8
707	Iron Mtn	*	*	*	0	0	0	6.6	97
708	Little Bear Creek	0.0‡	0.4‡	*	0	0	0	65.6	108.6
709	Ruby Creek	4.0	0	*	0	0	0	50.4	96.2
710	Turnbow Creek	0.0‡	2.4‡	1.4	0	1.4	0.2	43	70.6
711	East Fork Flat Creek	0.0‡	2‡	2.6	0	2.6	0.2	55	71.4
712	Turnbow Point	0.4	0.2	*	0	0	0.2	7.8	38
713	3 Mi S. of Potlatch	5.8	0‡	*	0	0	0	6.6	30
714	Rocky Point	0.0‡	0.8	*	0	0	0	13.2	79.6
715	Hatter Creek	0.0	0‡	0.6	0	0.6	0.2	7.4	32
716	Head of Hatter Creek	0.0	0	*	0	0	0	11.8	80.8
717	Nora Creek	1.4	0	*	0	0	0	21.2	81.4
718	Crummaring Creek	0.4	0.2	*	0	0	0	12.4	70.4
719	Basalt Hill	1.2	0.2	*	0	0	0	19	11.6
720	Browns Meadow	0.0‡	0.4	0	0	0	0.2	11.2	2.6
721	Smith Creek	0.4	0	*	0	0	0	100.2	70.6

Appendix 1. (continued)

IDL 2001 - 2008 Douglas-fir Tussock Moth Trap Results Cont.

				Mean Number of Moths Per Trap					
Plot #	Area	2008	2007	2006	2005	2004	2003	2002	2001
722	Prospect Peak	0.4	0	*	0	0	0	31.2	56.8
723	West Fork Mission Creek	0.0	0	*	0	0	0	27.8	22.2
724	Huckleberry Mtn	0.2	0‡	*	0	0	0	16.6	77.2
725	North Fork Pine Creek	1.2‡	0.75	*	0	0	0	21.6	93
726	Mineral Creek	0.0	0	*	0	0	0	20.2	78
727	South of Sanders	0.0	0	*	0	0	0	77.8	86.8
800	Mason Butte	9.0‡	7.25	*	*	*	0	20.8	63
801	1 mi SW of Moctileme Butte	2.8	0.2	*	*	*	0	30.2	91.4
802	1.9 mi S of Plummer	1.6	0	*	*	*	0	24.8	75.2
803	Little Plummer Creek	17.6‡	5.8	*	*	*	0	18	54.4
804	Syringa Creek	0.0	0	*	*	*	0	21.2	66.4
805	John Point	0.2	*	*	*	*	0	20.4	61.6
806	2 mi W of Pettis Point	1.0	0	*	*	*	0	22.6	71.2
807	Davis Creek	0.0	0	*	*	*	0	17.8	55.6
808	Renfro Creek	0.0	0	*	*	*	0	14.8	44.2
809	Crystal Creek	0.2	0.2	*	*	*	0	10.4	29.4
810	Child Creek	0.4	0	*	*	*	0	17.2	52.8
811	Hobo Pass	2.4‡	0.6	*	*	*	0	7.8	25.4
812	Hemlock Butte	0.2‡	0.4	*	*	*	0	9.2	28.2
813	Carpenter Peak	0.0	0	*	*	*	0	18.8	57.8
814	Tyson Creek	0.0	0	*	*	*	0	30.2	87.6
815	Heinaman Creek	0.6	0	*	*	*	0	25.2	85.2
816	Green Mtn	0.4	0	*	*	*	0	31	86.2
817	Willow Creek	2.6‡	1.2	*	*	*	0	22.2	73.2
818	Head of Emerald Creek	0.0	0.6	*	*	*	0	28.2	86
819	East Fork Emerald Creek	0.0	0	*	*	*	0	25	75.2
820	Head of Bobs Creek	0.0	0	*	*	*	0	25.4	79
821	East Fork of Potlatch River	0.2	0	*	*	*	0	25.2	67.2
822	Head of Moose Creek	0.0	0.2	*	*	*	0	24.8	69.6
823	Beals Butte	0.0	0	*	*	*	0	39	106.2
900N	Hauser	1.4	*	*	*	*	*	*	*
901N	Cougar Bay	1.4	*	*	*	*	*	*	*
902N	Marie Creek	0.8	*	*	*	*	*	*	*
903N	Canary Creek	0	*	*	*	*	*	*	*
	Number of Sites Trapped:	124	120	51	98	98	122	122	117
	Average Number of Moths per Plot:	1.12	0.42	0.33	0.00	0.16	0.23	31.30	71.50

* Indicates Sites Not Trapped

‡ Indicates larval survey

Appendix 2. Mean trap catch for USFS monitored plots from Potlatch to Lucille for the past 7 years.

USFS R1 2001 - 2008 Douglas-fir Tussock Moth Trap Results

		Mean Number of Moths per Trap							
Plot #	Site Name	2008	2007	2006	2005	2004	2003	2002	2001
1-1	Lodge Pt	0.0‡	0.0	0.0	0.0	0.0	0.2	1.2	1.6
1-2	Goddard	*	*	*	*	*		*	*
1-3	Pine Knob	0.0‡	0.2	0.3	0.0	0.0	0.0	1.0	4.8
1-4	Potatoe Hill	0.0‡	0.0	0.0	0.0	0.0	0.0	0.2	0.2
1-5	Big Tinker	0.0‡	0.0	0.2	0.0	0.0	0.0	0.6	1.4
2-1	Rhett Cr	0.33§	0.0	0.0	0.0	0.0	0.0	0.0	0.4
2-2	Christie Cr	0.67§	0.0	0.0	0.0	0.0	0.0	0.0	8.0
2-3	Cow Cr Saddle	*	*	*	0.0	0.0	0.0	0.2	0.2
2-4	Low Saddle	*	0.0	0.4	0.0	0.0	0.0	0.0	0.4
2-5	S. Cow Cr	0.0§	0.0	0.0	0.0	0.0	0.0	0.0	1.8
2-6	Spring Mtns	0.0§	0.0	0.0	*	*	*	*	*
3-1	Keuterville	0.0§	0.0	0.0	0.0	0.0	0.0	0.0	2.2
3-2	Cottonwood Butte	0.0‡	0.0	0.0	0.0	0.0	0.0	0.0	2.8
4-1	Lake Waha	0.0§	0.0	0.0	0.0	0.2	0.0	0.0	10.2
4-2	Black Pine	1.25‡	0.2	0.0	0.0	0.0		0.2	18.2
4-3	Junction	0.0§	0.0	0.0	0.0	0.0	0.0	0.0	*
4-4	Captain John	0.33§	0.0	0.0	0.0	0.0	0.0	0.2	3.6
4-5	Webb Cr	*	0.0	0.0	0.0	0.0	0.0	0.0	1.4
4-6	Forest	*	*	*	*	*	*	*	*
4-7	New Site	0.0§	*	*	*	*	*	*	*
5-1	Johnson	*	*	0.0	0.0	0.0	0.0	4.8	4.0
5-2	Angel Butte	0.0	*	0.0	0.0	0.0	0.4	0.8	5.8
5-3	Grangemont	0.80	1.4	1.4	0.0	0.0	0.4	2.2	16.2
5-4	Bargamin Cr	0.60	4.6	0.0	0.0	0.0	0.0	4.8	35.6
5-5	Bald Mtn	0.20	3.4	1.8	0.0	0.0	0.2	9.0	36.0
5-6	Summit Landing	1.00	3.2	0.6	0.0	0.0	0.2	0.0	14.6
5-7	Shin Pt	0.25	0.0	0.0	0.0	0.0	0.0	1.3	13.2
5-8	Swanson Cr	0.40	0.8	0.6	0.0	0.0	1.4	0.0	17.5
5-9	Skull Cr	*	*	*	*	*	*	*	*
5-10	Cooper	*	0.0	0.0	0.0	0.0	0.0	0.2	3.8
6-1	Canyon Junction	0.25‡	0.4	0.0	0.0	0.0	0.0	0.8	11.2
6-2	Fan saddle	*	0.0	0.0	0.0	0.0	0.0	0.2	0.6
6-3	New Site	0.0	*	*	*	*	*	*	*
7-1	Laird Park	0.0	0.2	0.0	0.0	0.0	0.0	52.2	*
7-2	Little Bald Mtn.	*	0.0	0.0	0.0	0.0	0.2	22.0	*
7-3	Little Boulder Cr.	0.20	0.0	1.2	0.0	0.0	4.0	40.4	*
7-4	W. Fork Potlatch R.	0.80	0.0	0.8	0.6	0.0	2.4	40.4	*
7-5	Elk Creek Falls	0.80	0.2	0.4	0.4	0.0	4.8	15.8	*
7-6	Morris Creek	0.75	0.0	0.2	0.0	0.0	0.2	26.5	*
	Number of Sites Trapped:	29	31	33	33	33	32	33	26
	Mean Number of Moths per Site:	0.30	0.47	0.24	0.03	0.01	0.45	6.82	8.30

* Indicates Sites Not Trapped
‡ Indicates 4 traps/site in 2008
§ Indicates 3 traps/site in 2008